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Global situation for organic tree fruits

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ABSTRACT

Consumer demand for organic tree fruit products in Europe and North America, the dominant organic food markets, has spurred increases in organic area and production globally. From 2008–2013, the area of production grew 109%, 42%, and 53% for organic temperate tree fruits, citrus, and tropical/subtropical fruits, respectively, with much lower growth for total area (non-organic plus organic) in these categories. Most organic tree fruits represent approximately 1–2% of total production area for a specific fruit; avocado is the exception, with 8% of avocado area worldwide under organic management. Mexico, Italy, and China are the top three countries in terms of organic tree fruit area, but not all countries segregate tree fruit crops in the organic statistics they report. Organic standards are not identical among countries, although over 90% of organic sales are in the USA and EU where standards are harmonized. Published data on the relative yield of organic to conventional tree fruits are scarce and range from 42% to 126% of conventional yields. Reported production costs for organic tree fruits were generally higher than conventional, with higher cost for fertilizers a frequent reason. Higher selling prices for organic tree fruits were able to compensate for lower yields and higher costs in most cases, leading to a higher net return under certified organic management. Key technological advances, such as pheromone mating disruption, have been critical to the expansion of organic tree fruit production, and more innovation will be needed in the future to address new challenges involving invasive pests and climate change, as well as disease-resistance cultivars and new pest control tools to enable production in areas not currently involved in the organic market.

1. Introduction

In North America and Europe, health and nutrition experts are encouraging people to eat more fruits and vegetables as part of a healthy diet (USDA, 2010). At the same time, many consumers in these regions are more aware of various food attributes, including pesticide residues, genetic modification of organisms, preservatives and additives, and nutrient and antioxidant content (*e.g.*, Baranski et al., 2014; Bradman et al., 2015; Brandt et al., 2011; Davis, 2009; Smith et al., 2012), leading an increasing number to seek out organically grown food products (Hartman Group, 2013). Europe and North America comprised approximately 92% of the global market for organic foods in 2013 (Sahota, 2015), reaching an estimated retail sales value of 72 billion USD. Fruits and vegetables accounted for 34% of all retail organic food sales in the USA (OTA, 2014) and an estimated 11% of all USA produce sales were thought to be organic. Organic food sales have been growing 10–12% annually in the USA and 6% annually in Europe in recent years (OTA, 2014; Willer and Schaack, 2015). Growth rate temporarily decreased in 2009 due to the global recession but subsequently increased. Given the intersection of multiple health themes, the demand for organic fruits is expected to continue to grow. In order to understand the current situation and future opportunities with organic tree fruits, which are the dominant component of the organic fruit sector, this paper reviews recent data on global and regional production, examples of price trends, and economic comparisons with conventional production.

While research publications on organic production, including organic tree fruit, have increased in number over the past decade, information on the organic sector is often proprietary or found in reports, popular articles, web pages, and sources other than peer-reviewed journals. Information can also be found in sources related to organic certification and standards, which tend to be more regulatory or partisan in nature. It is necessary to refer to all these sources including scientific publications in order to characterize

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the organic tree fruit sector, and the authors have drawn on all sources in preparing this review.

2. Extent and geography of organic tree fruit

2.1. Data sources and quality

Comprehensive statistics on organic agriculture in general, and organic tree fruits specifically, were not available until recently. Isolated estimates could be found for organic apples (*Malus* × *domestica*), pears (*Pyrus communis*), and cherries (*Prunus avium*) in Washington and California, USA (Granatstein, 2000), and for organic apples in the USA (USDA-ERS, 2015) in the 1990s. Data on organic agriculture worldwide were compiled for the first time in 1999 by Willer and Yussefi (2000), and today, the Research Institute of Organic Agriculture (FiBL), in cooperation with the International Federation of Organic Agriculture Movements (IFOAM—Organics International) publishes an annual report "The World of Organic Agriculture" (*e.g.*, Willer and Lernoud, 2015) that assembles data from various sources, including the EU statistical database, national statistics and reports where available, organic certification agencies, and other industry contacts. Currently the annual report includes data covering 170 countries and numerous specific crops, focusing on land area under organic management (converted or certified; and in conversion or transition), number of organic farms, retail sales data, and percentages of all farmland or crop type represented by organic production.

"Converted" and "certified are synonymous, meaning the land has met the criteria of organic certification for the home country and/or the market where the product will be sold, and can carry the official label of "certified organic" as in the USA or "BIO" in the EU. "In conversion" and "transition" are synonymous and indicate land under organic management that has not yet met the criterion of 36 months without the use of a prohibited substance before a crop can be labeled "organic" for sale in the marketplace. Organic standards do vary by region and country. However, progress has been made in harmonization, and there are currently equivalency agreements between the USA and the EU, Canada, Switzerland, Japan, and South Korea, with an agreement with Mexico in process. Many developing countries do not have their own national laws or standards, and growers in those countries are normally certified by agencies that are accredited in either the EU or USA, or both, since these two regions are the primary destination for exports. Thus, there is a large degree of uniformity in standards for many countries. China has been developing its own national standard (CNCA, 2015) and allows production under it for domestic markets, while any product exported from China to the USA or EU must be certified to those standards. Since most of the organic tree fruits are either grown in the USA or EU or sold to them, the definition of organic is very similar. China is the notable exception, and currently data are not available that separate the area meeting the Chinese standard versus the area meeting the export standards for EU or USA.

"The World of Organic Agriculture" report provided much of the data on area and geography of organic tree fruits used here. Data quality and scope have been continually improving as more public statistical agencies collect data on the organic sector. In the most recent report, data on organic tree fruits in China were received for the first time in nearly a decade (CNCA, 2015). Certain major tree fruit producing countries (*e.g.*, Brazil, India, Nigeria) either provided no data at all or no data that specified general tree fruit or crop specific area. Thus, in many cases, data presented are incomplete and are more likely to underestimate the actual area of organic tree fruit.

In addition, both Washington and California, two major tree fruit producing states in the USA that account for 80–90% of organic tree fruit production, have excellent data on the organic sector, and were sources for the regional examples presented below.

2.2. Global area of organic tree fruits

In 2013, agricultural land under organic management represented almost 1% of all agricultural land worldwide (Willer and Lernoud, 2015). There were approximately 43.1 million ha of agricultural land (including permanent grazing lands, but excluding wild harvest lands) under organic management worldwide. Organic tree fruit crops comprised approximately 1.2% of all organic agricultural land or 500,000 ha. This area included both converted and in conversion land, with 44%, 61%, and 74% of area converted, respectively, for temperate, citrus, and tropical/subtropical fruits, indicating the large increase in certified organic fruit that may come

Table 1
Global area, expansion, and share of organic tree fruit crops.

	2013 organic area (ha)	2008–2013 change in area (%) Organic	Category All	Organic share Share[a] (%)	Leading producers[c] Share[b] (%)	
Temperate	213,023	109	–	43	1.8	Poland (20), China (16), Italy (13)
Apple	93,219	165	13	44	1.8	Poland (38), China (18), USA (8)
Apricot	22,282	108	4	10	4.4	China (53), Turkey (23), Italy (9)
Pear	16,925	145	12	8	1.0	China (27), Argentina (10), Italy (7)
Plum	10,420	29	7	5	0.4	Romania (21), France (17), Czech Rep. (14)
Cherry	9299	28	9	4	1.5	Italy (32), Turkey (25), Germany (13)
No details; Other[d]	52,643	49	–	25	–	USA (19)
Citrus	81,577	42	–	16	0.9	Italy (35), Mexico (15), China (14)
Oranges	42,420	48	1	52	1.0	Italy (31), Mexico (28), Ghana (15)
Lemon, lime	9,789	59	−8	12	1.0	Italy (57), Spain (19)
No details	21,210	−25	–	26	–	USA (35)
Tropical/Sub-tropical	205,464	53	–	41	0.9	Mexico (28), Dominican Rep. (14), Philippines (12)
Banana	79,927	43	6	39	1.6	Dominican Rep. (35), Philippines (32), Ecuador (14)
Avocado	44,862	23	21	22	8.7	Mexico (92), Kenya (3)
Mango	23,301	−9	14	11	0.4	Mexico (54), Burkina Faso (10)
No details; Other[4]	25,171	28	–	12	–	Colombia (33), USA (27), Saudi Arabia (22)

Category area does not equal the sum of all the individual crops, as not all individual crops for that category were included.
Primary data source: OrganicDataNetwork (2015).

[a] Category share: for the three categories, this is their percent area of all organic tree fruit; for individual crops, this is their percent area of the category they are in.
[b] Organic share: 2013 organic area divided by 2013 global area for that crop (FAOSTAT, 2015).
[c] Leading producers: for the category or crop, the top countries in terms of organic area, with the percent of the category or crop that country represents in parentheses (X).
[d] "Other" includes peach, nectarine, quince, grapefruit, pomelo, tangerine, carob, dates, figs, guava, kiwi, litchi, noni, papaya, passion fruit, persimmon, pineapple, pitaya, and pomegranate.